

## **REFERENCE 14**

**Oregon Department of Fish and wildlife, December 1998, 1997  
Willamette River Spring Chinook Salmon run, Fisheries, and  
Passage at Willamette falls.**

Doc ID# 136743

**1997 WILLAMETTE RIVER  
SPRING CHINOOK SALMON RUN,  
FISHERIES, AND PASSAGE  
AT WILLAMETTE FALLS**

**Oregon Department of Fish and Wildlife**

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# **1997 WILLAMETTE RIVER SPRING CHINOOK SALMON RUN**

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**Oregon Department of Fish and Wildlife**

**This project was primarily financed with funds  
obtained through the Federal Aid in Sport Fish Restoration Program  
Project Number F-119-R 13 and F-119-R-14 and  
Bonneville Power Administration (administered by  
Pacific States Marine Fisheries Commission)  
Contract No. 96-32**

**December 1998**

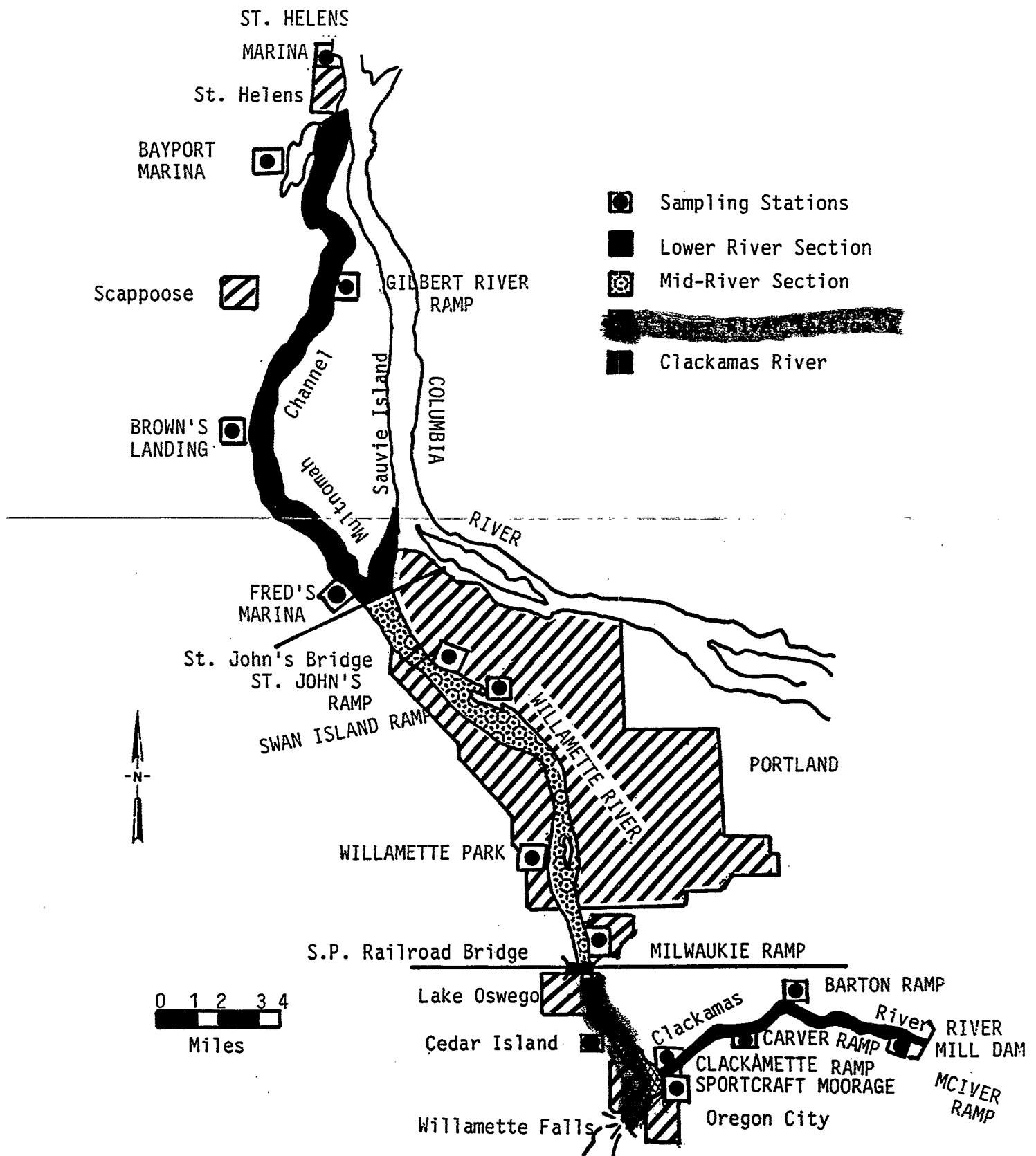


Figure 1. Locations of Sampling Stations for Spring Chinook in the Lower Clackamas, and Willamette Rivers and Multnomah Channel.

# **METHODS**

## **Preseason Forecast**

The Willamette River spring chinook run size can be determined with reasonable accuracy by analyzing different known data concerning the returning age classes of spring chinook from the previous year. Separate predictions were developed for age-3, -4, -5, and -6 fish. Since Willamette spring chinook return primarily as age-4 and -5 fish, it was found that regression analysis could be used to predict the return of each of these two age classes. Returns of age-4 and -5 fish were predicted, with multiple-variable linear regression models. Predicted returns of age-3 and age-6 fish are based on cohort ratios of recent years' actual returns.

## **Run Size Determination**

~~The estimated size of the spring chinook run entering the Willamette River is determined by adding the lower Willamette recreational catch, the Willamette Falls fishway count, prespawning mortalities observed below the falls, the Willamette Falls tribal dip-net catch, the lower Clackamas recreational catch, and the escapement into the Clackamas River system. The Clackamas River escapement estimate is based upon returns to Eagle Creek and Clackamas River hatcheries, North Fork fishway counts, and the number of natural spawners in the lower Clackamas River. The minimum run of Willamette spring chinook entering the Columbia is determined by adding the number of these fish caught in the lower Columbia sport and commercial fisheries to the number entering the Willamette.~~

## **Estimating Harvest by the Recreational Fishery**

Since 1974 a sampling plan developed by the Survey Research Center of Oregon State University has been used to determine the total effort and catch of spring chinook in the lower Willamette recreational fishery. Total angling effort determined by periodic aerial surveys is combined with systematic creel surveys conducted at major fishery sites to statistically generate accurate estimates of recreational angling pressure and angler success (Fredd, 1977; Collins, 1982).

Since 1974 the Willamette River below Willamette Falls has been divided into three sampling sections, with a fourth section (the Clackamas River) added in 1979: (1) the upper river fishery extending 6 miles from Willamette Falls to the Southern Pacific Railroad bridge at Lake Oswego; (2) the middle river fishery extending 16 miles from the S. P. Railroad bridge to the St. Johns Bridge; (3) the lower river fishery, which includes 4 miles of the Willamette River from the St. Johns Bridge to the mouth and 22 miles of Multnomah Channel from the head of the channel to St. Helens; and (4) the Clackamas River extending upstream 23 miles from the mouth at Gladstone to River Mill Dam. Samplers contacted anglers at numerous access points on the Clackamas River. Locations of Willamette River sampling stations used in 1997 are shown in Figure 1.

# RESULTS

## Estimated Run Size

The total Willamette River-bound spring chinook that entered the Columbia River in 1997 was estimated to number 35,300 (Table 1) of which 34,500 were adults (Table 2). It was estimated that 35,000 spring chinook entered the Willamette River in 1997. The 1997 run was the second lowest run since 1961. The portion of Clackamas River-bound spring chinook that entered the Willamette River in 1997 was estimated to number 6,200 (Table 3).

The preseason forecast for the 1997 run size was 30,000 total fish with 23,700 age-4 fish, 4,800 age-5 fish, and 1,500 age-3 and age-6 year fish. The actual run size total of 35,300 fish was 118% of the preseason forecast (Table 4). Actual age class components in 1997 were 18,700 age-4 fish (21% below predicted), 15,500 age-5 fish (223% above predicted), and 1,100 age-3 and age-6 year fish (27% below predicted).

Passage of adult spring chinook over Willamette Falls occurs after the lower river fisheries are largely complete (Figure 3). Updating the actual run size based on Willamette Falls counts cannot be accomplished with reasonable accuracy until a substantial portion of the run has passed the Falls, and water conditions play a major role in passage timing. Management of the lower Willamette fishery to achieve escapement goals must currently be based upon preseason run size estimates.

## Willamette Recreational Fishery

### Catch and Effort

Anglers fishing the lower Willamette River in 1997 were restricted to a catch quota of 2,000 spring chinook (see Discussion section at end of this report) and the final catch was 1,886 (Table 1 and Figure 4). The magnitude of the recreational catch, particularly the size of daily catches, is affected by river flow, water clarity, the number of salmon present, and angler effort.

The first spring chinook was caught February 11, 1997, by a bank angler fishing below the mouth of the Clackamas River. The January and February catch totaled 23. River conditions were poor most of March with the majority of the 423 total catch for the month occurring in the last week. As the river dropped and cleared catches increased dramatically. The highest catch occurred during the first week in April. (Figures 5 and 6). In the first three open fishing days in April the catch totaled 1,415 and the fishery quota was reached on April 9. The fishery closed before the normal peak catch period from mid-April to mid-May in the lower Willamette. A catch of 25 was made throughout the season from a bank fishery in Multnomah Channel. The total January through April 9 catch was 1,886 (Table 1).

The lower Clackamas sport catch peaked in late May with the fishery lasting into July. The total 1997 lower Clackamas sport catch was 1,732 (Table 1 and Figure 7).

The catch distribution in 1997 was 559 (15%) salmon taken in the lower section (including 25 taken by bank anglers), 544 (15%) in the middle section, 783 (22%) in the upper section (including 80 taken by bank anglers), and 1,732 (48%) in the Clackamas River (including 284 taken by bank anglers) (Table 5). The 1997 catch and effort by area and week is given in Tables 6 and 7.

Since 1974 the lower river section consistently received the heaviest angling pressure, but in 1997 was only 15% of the total angler effort. The middle river section consistently receives the lowest angling pressure annually and in 1997 produced 11% of the total. The upper river section consistently comes in second, but in 1997 produced 19% of the total (Table 8). The 15,000 angler days expended by Willamette anglers in 1997 was the lowest since 1946, and a 90% decrease from the 145,500 angler-day average of the previous 5 years (1992-96) (Table 9). The 13,000 angler days expended by Clackamas anglers in 1997 was the lowest since 1979, and a 29% decrease from the 18,300 angler-day average of the previous 5 years (Table 10).

In terms of salmon per day, boat fishermen in the upper section of the Willamette were most successful while those in the lower section of the Willamette were least successful. Only boat anglers on the Clackamas River caught fish at higher rates than those in the upper section. Expert angler guides directed numerous parties on the Clackamas and may partially account for the high catch rates. It required 7.0 days for a boat angler and 34.0 days for a bank angler to harvest one salmon on the Willamette in 1997 (Table 9). The combined boat and bank rate of 7.9 days to harvest a fish on the Willamette was lower than the 1992-96 average of 11.2 days per fish. It required 5.0 days for a boat angler, 20.0 days for a bank angler, and 7.6 days overall to harvest one salmon on the Clackamas in 1997 (Table 10). The combined boat and bank catch rate of 7.6 days to harvest a fish on the Clackamas was slightly lower than the 1992-96 average of 8.7 days per fish.

The salmon-steelhead catch card estimate of spring chinook taken by anglers above Willamette Falls was 4,646 in 1996, the third lowest catch in the last ten years with a harvest rate of 23% of the Willamette Falls spring chinook adult count (Table 11). No data is currently available for 1997.

## **Biosampling**

Willamette samplers recorded weights of 202 salmon ranging from 7.6 to 33.0 lbs, with a mean weight of 16.7 lbs (Table 12). Mean weights separately determined for age-4 and age-5 fish were 12.8 and 19.0 lbs, respectively. Weights of 110 Clackamas chinook ranged from 4.7 to 35.0 lbs, with a mean weight of 15.9 lbs (Table 13). Mean weight of age-4 fish was 12.5 lbs and for age-5 fish was 19.9 lbs.

Scales from 674 spring chinook taken in the recreational fishery below Willamette Falls in 1997 showed the Willamette catch was comprised of 0% age-3, 34.1% age-4, 65.1% age-5, and 0.8% age-6 fish (Table 12).

Age composition of the Clackamas River catch in 1997 was determined to be 3.4% age-3, 52.9% age-4, 43.1% age-5, and 0.6% age-6 fish from a sample of 529 scales from the Clackamas recreational fishery (Table 13).

The larger age-5 chinook enter the Columbia and Willamette rivers earlier than do the smaller age-4 fish. Age-5 chinook are dominant throughout March and reach peak abundance in the lower Columbia by late March or early April. Age-4 fish enter in increasing numbers after mid-March reaching peak abundance in the lower Columbia during April. These run timing characteristics are also observed in the lower Willamette recreational fishery. The mid-February through March fishery averages about 20% age-4 fish and the April and May fishery averages about 45% age-4 fish (Table 14).

Larger size at ocean entry and rapid ocean growth may increase size and percentage of spring chinook returning at age-4 in some years. The average size of age-4 salmon taken in the Willamette fishery during 1997 was above average, with 28.6% over 80 cm fork length compared to 24.4% in 1996, and 13.6% in 1995, 19.7% in 1994.

Since 1992 the Bonneville Power Administration has provided funding for increased sampling of the lower Willamette and lower Columbia fisheries for coded-wire-tag recovery. The minimum catch sampling goal was 20%. Because the minimum catch sampling goal of 20% was not achieved in the lower Willamette in 1992, Bonneville Power Administration (BPA) has provided additional funding. The sampling level of the lower Willamette and lower Clackamas sport catch of spring chinook has exceeded 20% since 1992. In 1997 a total of 127 coded-wire tags were collected from 1,419 fish sampled on the lower Willamette and Clackamas rivers. Analysis of these tag returns will contribute to knowledge of effective hatchery operations and research activities, as well as defining harvest rates and locations of harvest.